218781US-0PCT

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF   :

TAKEYOSHI SHIBASAKI ET AL   : ATTN: APPLICATION DIVISION

SERIAL NO: NEW U.S. PCT APPLN   :
  (Based on PCT/JP01/05252)

FILED: HEREWITH   :

FOR: AMORPHOUS FINE SILICA
      PARTICLE, ITS PRODUCTION
      PROCESS AND APPLICATION

PRELIMINARY AMENDMENT

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

Prior to examination on the merits, please amend the above-identified application as

follows.

IN THE CLAIMS

Please amend the claims as shown on the marked-up copy following this amendment

to read as follows.

1. (Amended) An amorphous fine silica particle made by flame hydrolysis of a

silicon compound, wherein said silica particle has an average particle diameter (median

diameter) of from 0.1 to 0.7 μm, a specific surface area by BET of from 5 to 30 m^2/g, and a

dispersion coefficient (z) of less than 40 as shown in the following formula [I],

$$Z = Y/2X \qquad\qquad [I]$$

wherein X is a median size, Y is a particle size range which is from 10% to 90% of an accumulative particle size.

2. (Amended) A filler of an epoxy molding compound, comprising the amorphous fine silica particle according to Claim 1.

3. (Amended) A filler for anti-blocking of a plastic film or sheet, comprising the amorphous fine silica particle according to Claim 1.

4. (Amended) An external additive for a toner, comprising the amorphous fine silica particle according to Claim 1.

5. (Amended) A surface protection layer or an electric charge transportation layer of a photo conductor of an electronic photograph, comprising the amorphous fine silica particle according to Claim 1.

6. (Amended) An amorphous fine silica particle made by a flame hydrolysis of a silicon compound, wherein said silica particle has an average particle diameter (median size) of from 0.1 to 0.7 μm, a specific surface area by BET of from 5 to 30 m^2/g, a dispersion coefficient (z) of less than 40 as shown in the following formula [I], and an absolute value of triboelectrostatic charge to the specific surface area by BET is more than 20 μc/m^2

$Z = Y/2X$ [I]

wherein X is a median size, Y is a particle size range which is from 10% to 90% of an accumulative particle size.

7. (Amended) The amorphous fine silica particle according to Claim 6, wherein said silica particle is surface-treated with a silane coupling agent, an organo-polysiloxane or a combination thereof.
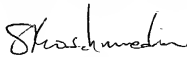
9. (Amended) A development agent for an electronic photograph, comprising the amorphous fine silica particle according to Claim 6.

10. (Amended) A surface protection layer material of a photo conductor, comprising the amorphous fine silica particle according to Claim 6.

11. (Amended) A material of an electric charge transportation layer, comprising the amorphous fine silica particle according to Claim 6.

12. (Amended) A process for producing an amorphous fine silica particle, said process comprising

leading a gaseous silicon compound into a flame to be hydrolyzed to form said particle,

maintaining said silica particle for a time at a temperature greater than the melting point of silica, and

forming said amorphous fine silica particle having an average particle diameter (median size) of from 0.1 to 0.7 μm and a specific surface area of from 5 to 30 m^2/g,

wherein a flame temperature is greater than the melting point of silica and a silica concentration in the flame (v) is more than 0.25kg/Nm^3.

13. (Amended) The process according to Claim 12, wherein the silica concentration in the flame (v) is from 0.25 to 1.0kg/Nm^3.

14. (Amended) The process according to Claim 12, wherein a residence time (t) in the flame of the silica particle is from 0.02 to 0.30 seconds.

15. (Amended) The process according to Claim 12, further comprising,

controlling a specific surface area (S), a median size (r), a silica concentration in the flame (v), and a staying time in the flame (t), according to the following formula [II] or [III], respectively.

$$S = 3.52 \ (v \cdot t)^{-0.4} \qquad \qquad [II]$$

$$r = 1.07 \ (v \cdot t)^{0.4} \qquad \qquad [III]$$

-3-

REMARKS

Claims 1-15 are active in the present application. Claims 1-15 have been amended for clarity and to remove multiple dependencies. No new matter is added. An action on the merits and allowance of claims is solicited.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.

Norman F. Oblon
Attorney of Record
Registration No. 24,618

Stefan U. Koschmieder, Ph.D.
Registration No. 50,238

22850

(703) 413-3000
Fax #: (703)413-2220
NFO/kst

I:\atty\SUKOS\218781us-pr.wpd

-4-

218781US-0PCT

IN THE CLAIMS

--1. (Amended) An amorphous fine silica particle made by flame hydrolysis of a silicon compound, wherein said silica particle [having, 0.1 - 0.7μm of the] <u>has an</u> average particle diameter (median diameter) <u>of from 0.1 to 0.7 μm</u>, [5 - 30m^2/g of the] <u>a</u> specific surface area by BET <u>of from 5 to 30 m^2/g</u>, and [less than 40 of the] <u>a</u> dispersion coefficient (z) <u>of less than 40 as</u> shown in the following formula [I],

$$Z = Y/2X\ [\cdots]\qquad\qquad [I]$$

[, where] <u>wherein</u> X is a median size, Y is a particle size range[,] which is from 10% to 90% of an accumulative particle size.

2. (Amended) [The amorphous fine silica particle according to Claim 1, wherein said silica particle is used as a] <u>A</u> filler of [a semiconductor resin-sealing agent] <u>an epoxy molding compound, comprising the amorphous fine silica particle according to Claim 1</u>.

3. (Amended) [The amorphous fine silica particle according to Claim 1, wherein said silica particle is used as a] <u>A</u> filler for anti-blocking of a plastic film or sheet <u>, comprising the amorphous fine silica particle according to Claim 1</u>.

4. (Amended) [The amorphous fine silica particle according to Claim 1, wherein said silica particle is used as an] <u>An external additive</u> [outer additional agent] for a toner <u>, comprising the amorphous fine silica particle according to Claim 1</u>.

5. (Amended) [The amorphous fine silica particle according to Claim 1, wherein said silica particle is used for a] A surface protection layer or an electric charge transportation layer of a photo conductor of an electronic photograph , comprising the amorphous fine silica particle according to Claim 1.

6. (Amended) An amorphous fine silica particle made by a flame hydrolysis of a silicon compound, wherein said silica particle [having, 0.1 - 0.7μm of the] has an average particle diameter (median size) of from 0.1 to 0.7 μm, [5 - 30m^2/g of the] a specific surface area by BET of from 5 to 30 m^2/g, [less than 40 of the] a dispersion coefficient (z) of less than 40 as shown in the following formula [I], and [more than 20μC/m^2 of the] an absolute value of triboelectrostatic charge to the specific surface area by BET[.] is more than 20 μC/m^2 ,

$Z = Y/2X$ [···]   [I]

[, where] wherein X is a median size, Y is a particle size range which is from 10% to 90% of an accumulative particle size.

7. (Amended) The amorphous fine silica particle according to Claim 6, wherein said silica particle is surface-treated with a silane coupling agent, an [and/or] organo-polysiloxane or a combination thereof.

9. (Amended) A development agent for an electronic photograph, [wherein said agent uses] comprising the amorphous fine silica particle according to Claim 6[, Claim 7, or Claim 8].

10. (Amended) A surface protection layer material of a photo conductor[, wherein said material uses] , comprising the amorphous fine silica particle according to Claim 6[, Claim 7, or Claim 8].

11. (Amended) A material of an electric charge transportation layer[, wherein said material uses] , comprising the amorphous fine silica particle according to Claim 6[, Claim 7, or Claim 8].

12. (Amended) A [production] process [of] for producing an amorphous fine silica particle, said process comprising [by]

leading a gaseous silicon compound into a flame to be hydrolyzed [, the process also comprising,] to form a silica particle,

maintaining said silica particle for a time at a temperature greater than the melting point of silica, and

forming an amorphous fine silica particle having an average particle diameter (median size) of from 0.1 to 0.7 μm and a specific surface area of from 5 to 30 m^2/g,

[setting the] wherein a flame temperature [to be more] is greater than the melting point of silica [, setting the] a silica concentration in the flame [to be] (v) is more than 0.25kg/Nm^3,

[staying the generated silica particle for a short time under the high temperature which is more than melting point of silica, and

making an amorphous silica particle having 0.1 - 0.7μm of the average particle diameter (median size) and 5 - 30m^2/g of the specific surface area].

13. (Amended) The [production] process [of an amorphous fine silica particle] according to Claim 12, wherein the silica concentration in the flame (v) is from 0.25 [-] to 1.0kg/Nm^3.

14. (Amended) The [production] process [of an amorphous fine silica particle] according to Claim 12 [or Claim 13], wherein [the staying] a residence time (t) in the flame of the silica particle is from 0.02 [-] to 0.30 seconds.

-7-

15. (Amended) The [production] process [of an amorphous fine silica particle] according to Claim 12[, Claim 13, or Claim 14, the process] <u>further</u> comprising,

controlling [the] <u>a</u> specific surface area (S), [the] <u>a</u> median size (r), <u>a</u> silica concentration in the flame (v), and [the] <u>a</u> staying time in the flame (t), according to the following formula [II] or [III], respectively.

$$S = 3.52 \ (v \cdot t)^{-0.4} \ [\cdots]$$ [II]

$$r = 1.07 \ (v \cdot t)^{0.4} \ [\cdots]$$ [III]--